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PTO/SB/21 (08-00)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	09/728,624
	Filing Date	11/30/00
	First Named Inventor	Michael K. Eneboe
	Group Art Unit	2663
	Examiner Name	Juntima, N.
Total Number of Pages in This Submission	Attorney Docket Number	K35A0689

ENCLOSURES (check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment / Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/ Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Assignment Papers (for an Application) <input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____	<input type="checkbox"/> After Allowance Communication to Group <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input checked="" type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) (please identify below): Postcard
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
Firm or Individual name	Howard H. Sheerin, Registration No. 37,938
Signature	
Date	5/3/05

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PTO/SB/17 (01-03)

Approved for use through 04/30/2003. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

FEE TRANSMITTAL for FY 2003

Effective 01/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$ 500

Complete if Known

Application Number	09/728,624
Filing Date	11/30/00
First Named Inventor	Michael K. Eneboe
Examiner Name	Juntima, N.
Art Unit	2663
Attorney Docket No.	K35A0689

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☒ Deposit Account:

Deposit
Account
Number
Deposit
Account
Name

23-1209

WESTERN DIGITAL

The Commissioner is authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☒ Credit any overpayments

☒ Charge any additional fee(s) during the pendency of this application

☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1001 750	2001 375	Utility filing fee	
1002 330	2002 165	Design filing fee	
1003 520	2003 260	Plant filing fee	
1004 750	2004 375	Reissue filing fee	
1005 160	2005 80	Provisional filing fee	

SUBTOTAL (1) (\$)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

	Extra Claims	Fee from below	Fee Paid
Total Claims	-20** =	18.00	
Independent Claims	-3** =	84.00	
Multiple Dependent			

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description
1202 18	2202 9	Claims in excess of 20
1201 84	2201 42	Independent claims in excess of 3
1203 280	2203 140	Multiple dependent claim, if not paid
1204 84	2204 42	** Reissue independent claims over original patent
1205 18	2205 9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) (\$)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1051 130	2051 65	Surcharge - late filing fee or oath	
1052 50	2052 25	Surcharge - late provisional filing fee or cover sheet	
1053 130	1053 130	Non-English specification	
1812 2,520	1812 2,520	For filing a request for <i>ex parte</i> reexamination	
1804 920*	1804 920*	Requesting publication of SIR prior to Examiner action	
1805 1,840*	1805 1,840*	Requesting publication of SIR after Examiner action	
1251 110	2251 55	Extension for reply within first month	
1252 410	2252 205	Extension for reply within second month	
1253 930	2253 465	Extension for reply within third month	
1254 1,450	2254 725	Extension for reply within fourth month	
1255 1,970	2255 985	Extension for reply within fifth month	
1401 320	2401 160	Notice of Appeal	
1402 320	2402 160	Filing a brief in support of an appeal	500
1403 280	2403 140	Request for oral hearing	
1451 1,510	1451 1,510	Petition to institute a public use proceeding	
1452 110	2452 55	Petition to revive - unavoidable	
1453 1,300	2453 650	Petition to revive - unintentional	
1501 1,300	2501 650	Utility issue fee (or reissue)	
1502 470	2502 235	Design issue fee	
1503 630	2503 315	Plant issue fee	
1460 130	1460 130	Petitions to the Commissioner	
1807 50	1807 50	Processing fee under 37 CFR 1.17(q)	
1806 180	1806 180	Submission of Information Disclosure Stmt	
8021 40	8021 40	Recording each patent assignment per property (times number of properties)	
1809 750	2809 375	Filing a submission after final rejection (37 CFR 1.129(a))	
1810 750	2810 375	For each additional invention to be examined (37 CFR 1.129(b))	
1801 750	2801 375	Request for Continued Examination (RCE)	
1802 900	1802 900	Request for expedited examination of a design application	

Other fee (specify)

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$ 500

SUBMITTED BY

Name (Print/Type)	Howard H. Sheerin	Registration No. (Attorney/Agent)	37,938	Telephone	303-765-1689
Signature		Date	5/3/05		

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Western Digital Technologies, Inc.
Serial Number: 09/728,624



1

Patent
Docket: K35A0689

In re Application of:
Michael K. Eneboe
Serial No.: 09/728,624
Filed: 11/30/2000
Title: ISOCHRONOUS SWITCHED FABRIC
NETWORK

Group Art Unit: 2663
Examiner: Juntima, N.

BRIEF ON APPEAL

THE COMMISSIONER FOR PATENTS
ALEXANDRIA, VA 22313

Sir,

The following appeal brief is submitted pursuant to a Notice of Appeal filed 03/03/05 for the above-identified application.

REAL PARTY IN INTEREST

The real party in interest for the above-identified patent application is Western Digital Technologies, Inc. (see assignment REEL/FRAME: 012651/0433 and 012856/0231 identifying Western Digital Technologies, Inc. as assignee of the entire right, title and interest of the above-identified patent application).

RELATED APPEALS AND INTERFERENCES

There are no known appeals or interferences related to the instant appeal.

05/06/2005 MAHMED1 00000041 231209 09728624

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STATUS OF CLAIMS

Claims 1-19 are pending.

Claims 1, 11, and 19 stand rejected under 35 USC §102(e).

Claims 2-3, 6-7, 10, 12-13, and 16 stand rejected under 35 USC §103(a).

Claims 4-5, 8-9, 14-15, and 17-18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

STATUS OF AMENDMENTS

There are no outstanding amendments.

SUMMARY OF CLAIMED SUBJECT MATTER

FIG. 1 shows an embodiment of the present invention (recited in independent claims 1 and 11) as an isochronous switched fabric network 2 comprising a plurality of interconnected switched nodes 4 forming multiple dimensions (see FIG. 2 and description at page 4 lines 6-25). Each switched node 4A comprises an upstream port and a downstream port (FIG. 2) for each dimension, each upstream and downstream port comprising an input port and an output port (FIG. 8). A discovery facility discovers a depth of each dimension, and discovers resources within each switched node (page 5 lines 19 to page 6 line 9). An addressing facility, responsive to the discovery facility, assigns a matrix address (e.g., FIG. 3A page 6 lines 17-23) to each switched node. A resource reservation facility reserves resources within each switched node to establish a path through the switched fabric network for transmitting an isochronous data stream, and a scheduling facility schedules isochronous data transmitted through the switched fabric network. An example of how the resource reservation system operates is shown in FIG. 6A-6B described at page 10 lines 1-18.

ISSUES

- I. Whether claims 1, 11, and 19 are patentable under 35 USC §102(e) over Hahne et al (6,538,416).
- II. Whether claims 2-3, 6-7, 10, 12-13, and 16 are patentable under 35 USC §103(a) over Hahne et al (6,538,416)).

GROUPING OF CLAIMS

Claims 1-3, 6-7, 10-13, 16 and 19 stand rejected and are grouped together for the purpose of this appeal.

THE REFERENCES

The following references are relied upon by the examiner:

Hahne et al. 6,538,416 March 25, 2003

THE REJECTIONS

Claims 1, 11, and 19 stand rejected under 35 USC §102(e) as anticipated by Hahne. Regarding independent claims 1 and 11, the examiner asserts Hahne discloses a multi-dimensional network comprising a discovery facility for discovering a depth of each dimension, and an addressing facility for assigning a matrix address to each switched node. For example, the examiner asserts that the source router S1 which generates a PROBE message is used to discover a reservation path, and asserts that an addressing facility is inherently included to assign router identification. Regarding claim 19, the examiner asserts that Hahne inherently discloses the step of leasing idle resources within a first switched node to a second switched node.

Claims 2-3, 6-7, 10, 12-13 stand rejected under 35 USC §103(a) as unpatentable over Hahne. The examiner asserts that the limitations recited in these claims are well known in the art.

ARGUMENT

I. THE ISSUE UNDER 35 U.S.C. §102(e) – HAHNE

- A. The rejection should be reversed because Hahne does not disclose every element recited in the claims, particularly a discovery facility for discovering the depth of each dimension of a multi-dimensional network, and an addressing facility, responsive to the discovery facility, for assigning a matrix address to each switched node.

The rejection of claims 1, 11 and 19 should be reversed because the examiner has incorrectly construed Hahne as disclosing a multi-dimensional network comprising a discovery facility for discovering a depth of each dimension, and an addressing facility for assigning a matrix address to each switched node.

The examiner asserts that Hahne discloses a discovery facility as a PROBE message used to discover a reservation path between two routers, such as router S1 and S3 (col. 4, lines 40-45, 59-67 and col. 6 line 32 – col. 7 line 1-2). However, the PROBE message does not discover the depth of each dimension of the network, it merely discovers whether the nodes through a particular path have sufficient resources to accommodate the bandwidth of a requested reservation (col. 4, lines 59-66). If the network cannot accommodate the reservation, a rejection message is returned to the source router and the PROBE message is not forwarded any further downstream (col. 5, lines 1-3). Therefore, the PROBE message is not used to discover the depth of each dimension, it is used to discover a reservation path through the network. In addition, because the PROBE message is “not forwarded any further downstream” when an insufficient router is encountered, the PROBE message is not transmitted throughout the entire dimension and therefore cannot discover the depth of each dimension as recited in the claims.

The examiner further asserts that Hahne discloses an addressing facility as a GRAFT message 16 generated by router S3 and returned to router S1 in response to the PROBE message, wherein the GRAFT message contains router identification of each node between S1 to S3 in the reserved path (col. 7, lines 1-7 and 27-36). However, the GRAFT message merely performs the reservation process by reserving the resources at each node through the reserved path (col. 5, lines 5-17; col. 4, lines 45-47: “The GRAFT messages (i.e., response messages) establish and set-up the actual reservation.”) Although the GRAFT message contains router identification for each node, the identification applies only to the nodes through the reservation path to facilitate the reservation request. The GRAFT message does not assign a matrix address to each node through each dimension in response to the discovery facility as recited in the claims. The rejection should be reversed.

Regarding claim 19, the examiner asserts that Hahne inherently discloses the step of leasing idle resources within a first switched node to a second switched node. The examiner asserts that the routers disclosed by Hahne must inherently “lease” resources from one another in order to enable reservation of sufficient bandwidth. However, this interpretation of Hahne is incorrect. Referring to col. 4, lines 63-65, “as the PROBE message passes through the routers, each router determines if it is capable of accommodating the amount (i.e., size) of the bandwidth requested in the reservation.” If any one of the routers is incapable of accommodating the bandwidth request, a rejection message is returned to the source router (col. 5, lines 1-3). Nowhere does Hahne disclose or suggest that if a particular router cannot accommodate a bandwidth request to lease resources from another router in order to accommodate the request. The rejection should be reversed.

II. THE ISSUE UNDER 35 U.S.C. §103(a) – HAHNE

- A. The rejection should be reversed because the limitations recited in the dependent claims are not well known when combined with the elements recited in the independent claims.

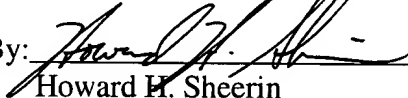
The rejections of claims 2-3, 6-7, 10, 12-13 should be reversed for the reasons set forth above since the limitations recited in the dependent claims, in combination with the limitations recited in the independent claims, are not made obvious by Hahne or the general knowledge of those skilled in the art.

CONCLUSION

Reversal of the rejections in this appeal is respectfully requested.

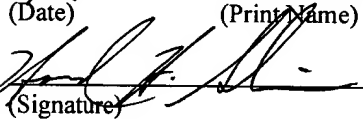
To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 23-1209, and please credit any excess fees to such deposit account.

Respectfully submitted,

Date: 5/3/05 By: 
Howard H. Sheerin
Reg. No. 37,938
Tel. No. (303) 765-1689

CERTIFICATE OF MAILING

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5/3/05 Howard H. Sheerin
(Date) (Print Name)

(Signature)

APPENDIX

A complete listing of the claims on appeal:

- 1 1. An isochronous switched fabric network comprising:
 - 2 (a) a plurality of interconnected switched nodes forming multiple dimensions, each
 - 3 switched node comprising an upstream port and a downstream port for each
 - 4 dimension, each upstream and downstream port comprising an input port and an
 - 5 output port;
 - 6 (b) a discovery facility for discovering a depth of each dimension, and for discovering
 - 7 resources within each switched node;
 - 8 (c) an addressing facility, responsive to the discovery facility, for assigning a matrix
 - 9 address to each switched node;
 - 10 (d) a resource reservation facility for reserving resources within each switched node to
 - 11 establish a path through the switched fabric network for transmitting an isochronous
 - 12 data stream; and
 - 13 (e) a scheduling facility for scheduling isochronous data transmitted through the switched
 - 14 fabric network.
- 1 2. The isochronous switched fabric network as recited in claim 1, wherein the discovery
- 2 facility comprises a central processor.
- 1 3. The isochronous switched fabric network as recited in claim 2, wherein the central
- 2 processor is attached to one of the switched nodes.
- 1 4. The switched fabric network as recited in claim 3, wherein:

- 2 (a) the switched nodes are connected in each dimension to form a loop;
- 3 (b) the central processor transmits an initialization packet through the output port of each
- 4 downstream port to the input port of the corresponding upstream ports of adjacent
- 5 switched nodes, thereby transmitting an initialization packet through each dimension;
- 6 (c) each switched node along each dimension modifies the initialization packet and
- 7 forwards the initialization packet through the corresponding downstream port for the
- 8 dimension; and
- 9 (d) the central processor evaluates each initialization packet transmitted through each
- 10 dimension to determine the depth of each dimension and to determine the resources
- 11 within each switched node.

1 5. The switched fabric network as recited in claim 4, wherein:

- 2 (a) the initialization packet comprises a dimension node number (DNN) comprising a
- 3 plurality of sub-fields;
- 4 (b) each sub-field represents one of the dimensions; and
- 5 (c) each switched node along each dimension increments the corresponding sub-field
- 6 within the DNN in the initialization packet.

1 6. The isochronous switched fabric network as recited in claim 1, wherein the discovery

2 facility is distributed throughout the switched nodes.

1 7. The isochronous switched fabric network as recited in claim 6, wherein the discovery

2 facility comprises a plurality of processors attached to the switched nodes.

1 8. The isochronous switched fabric network as recited in claim 6, wherein:

- 2 (a) the switched nodes are connected in each dimension to form a loop;

- 3 (b) an initialization packet comprising an initialization identification (ID) and an
4 initialization dimension node number (DNN) is transmitted between the switched
5 nodes of each dimension; and
6 (c) each switched node further comprises:
7 a local ID;
8 a local DNN representing at least part of the matrix address for the switched node;
9 and
10 a controller for comparing the initialization ID to the local ID and for modifying the
11 local DNN and the initialization DNN in response to the comparison.

- 1 9. The switched fabric network as recited in claim 1, wherein the matrix address comprises
2 a plurality of contiguous sub-fields corresponding to each dimension, each sub-field
3 comprising a number of bits n where:
4
$$n = \text{round}(0.5 + (\log(\text{dimension_depth})/\log(2)))$$

5 where the dimension_depth is the depth of the dimension corresponding to the sub-field.

- 1 10. The switched fabric network as recited in claim 1, wherein:
2 (a) the resource reservation facility is distributed throughout the switched nodes; and
3 (b) each switched node comprises a leasing facility for leasing idle resources to other
4 switched nodes.

- 1 11. A method of transmitting data through an isochronous switched fabric network
2 comprising a plurality of interconnected switched nodes forming multiple dimensions,
3 each switched node comprising an upstream port and a downstream port for each
4 dimension, each upstream and downstream port comprising an input port and an output
5 port, the method comprising the steps of:

- 6 (a) discovering a depth of each dimension and discovering resources within each
7 switched node;
8 (b) assigning a matrix address to each switched node in response to the step of
9 discovering a depth of each dimension;
10 (c) reserving resources within each switched node to establish a path through the
11 switched fabric network for transmitting an isochronous data stream; and
12 (d) scheduling isochronous data transmitted through the switched fabric network.

1 12. The method of transmitting data through an isochronous switched fabric network as
2 recited in claim 11, wherein a central processor performs the discovery steps.

1 13. The method of transmitting data through an isochronous switched fabric network as
2 recited in claim 12, wherein the central processor is attached to one of the switched
3 nodes.

1 14. The method of transmitting data through an isochronous switched fabric network as
2 recited in claim 13, wherein the switched nodes are connected in each dimension to form
3 a loop, the method further comprises the steps of:
4 (a) the central microprocessor transmitting an initialization packet through the output
5 port of each downstream port to the input port of the corresponding upstream ports of
6 adjacent switched nodes, thereby transmitting an initialization packet through each
7 dimension;
8 (b) modifying the initialization packet at each switched node and forwarding the
9 initialization packet through the corresponding downstream port for the dimension;
10 and

11 (c) the central microprocessor evaluating each initialization packet transmitted through
12 each dimension to determine the depth of each dimension and to determine the
13 resources within each switched node.

1 15. The method of transmitting data through an isochronous switched fabric network as
2 recited in claim 14, wherein:

3 (a) the initialization packet comprises a dimension node number (DNN) comprising a
4 plurality of sub-fields;

5 (b) each sub-field represents one of the dimensions; and

6 (c) each switched node along each dimension increments the corresponding sub-field
7 within the DNN in the initialization packet.

1 16. The method of transmitting data through an isochronous switched fabric network as
2 recited in claim 11, wherein the discovery step is distributed to the switched nodes.

1 17. The method of transmitting data through an isochronous switched fabric network as
2 recited in claim 16, wherein the switched nodes are connected in each dimension to form
3 a loop, each switched node comprises a local identification (ID) and a local dimension
4 node number (DNN) representing at least part of the matrix address for the switched
5 node, the method further comprises the steps of:

6 (a) transmitting an initialization packet comprising an initialization ID and an
7 initialization dimension node number (DNN) between the switched nodes of each
8 dimension; and

9 (b) comparing the initialization ID to the local ID within each switched node and
10 modifying the local DNN within each switched node and the initialization DNN in
11 response to the comparison.

1 18. The method of transmitting data through an isochronous switched fabric network as
2 recited in claim 11, wherein the matrix address comprises a plurality of contiguous sub-
3 fields corresponding to each dimension, each sub-field comprising a number of bits n
4 where:

$$n = \text{round}(0.5 + (\log(\text{dimension_depth})/\log(2)))$$

6 where the dimension_depth is the depth of the dimension corresponding to the sub-field.

1 19. The method of transmitting data through an isochronous switched fabric network as
2 recited in claim 11, further comprising the step of leasing idle resources within a first
3 switched node to a second switched node.